A Tale of Two Waters:

How a Pond was Successfully Restored to a River

By Steve Landry, Merrimack Watershed Supervisor

During the spring of 2009, the city of Manchester partnered with the Department of Environmental Services (DES) and 14 other funding partners to take an important step toward fostering a more resilient community and restoring impaired surface waters when construction was completed on the removal of the Maxwell Pond Dam on Black Brook. Although the physical removal of the 15 foot high dam took only a few weeks, the environmental degradation of Black Brook linked to the construction of this dam can be traced back over the last century.

By 2006, the century old Maxwell Pond Dam was starting to show signs of its old age with several structural deficiencies.

The crystal clear waters of Black Brook tumbling over bedrock back in the late 1880s attracted the attention of the Amoskeag Ice Company and prompted the construction of a dam on Black Brook for the purposes of harvesting ice blocks from the impoundment. That impounded section of Black Brook became known as Maxwell Pond. By the 1990s, the excess sand, gravel, and sediment delivered by Black Brook into Maxwell Pond had reduced the depth in the eight-acre pond from 10 to three feet.

Volunteers with the Manchester Urban Ponds Restoration Program began their participation in the New Hampshire Volunteer Lake Assessment Program in 2000. By 2002, the Maxwell Pond data collected by VLAP volunteers demonstrated that Maxwell Pond was unable to support aquatic life due to a lack of dissolved oxygen in the impoundment. As a result, DES added Maxwell Pond to the state's 2002 Clean Water Act 303(d) list of impaired waters.

By 2006, the century old Maxwell Pond Dam was starting to show signs of its old age with several structural deficiencies noted during a routine safety inspection performed by DES Dam Bureau engineers. DES ordered the city to either make necessary repairs, or remove the dam. Shortly thereafter, two successive storm events in New Hampshire resulted in the waters of Black Brook exceeding the capacity of the dam and spillway due to accumulated sediments and lack of flood storage. Flood waters surged around the dam, undermining Front Street, destroying public and private properties, and threatened to compromise the integrity of a gas main and an electrical conduit adjacent to the dam. After the second round of costly repairs due to flooding at this site, the mayor and board of aldermen voted to move forward with dam removal to eliminate a public safety hazard, reduce the expenses of maintaining a century old structure on city property, and to restore Black Brook to a free flowing system for the first time since the late 1880s.

In 2007, the DES Watershed Assistance Section awarded the city $105,000 through a restoration grant for dam removal and river restoration and assumed a lead role in managing the project. By February 2009, the $500,000 project budget was secured and the DES Dam Maintenance Section began removing the spillway of the Maxwell Pond Dam. Working in concert with the DES Dam Maintenance Section, both National Grid and Fairpoint Communications were on site to perform major relocations of their respective utilities. By the middle of March 2009, the entire spillway had been removed and Black Brook was once again cascading over bedrock where the Maxwell Pond Dam had acted as a barrier to fish migration for over a century.

There have been very encouraging sightings of fish species returning to Black Brook now that a barrier to their passage has been eliminated.

One of the more immediate restoration benefits of this dam removal was the rebound of dissolved oxygen levels in the waters of Black Brook and the ability to support aquatic species once again. This resulted in the removal of Maxwell Pond from the list of impaired waters in New Hampshire, and is featured on the US Environmental Protection Agency website as a nonpoint source success story at http://water.epa.gov/polwaste/nps/success319/nh_maxwell.cfm.

The Maxwell Pond Dam removal and Black Brook restoration project was selected as one of three projects across the country to be included in the 2010 American Rivers documentary titled "Restoring America's Rivers – Preparing for the Future." The DVD relates how communities across the nation are facing increasingly extreme storms that bring damaging floods. These events can strain outdated infrastructure and endanger public safety. Restoring America's Rivers tells the story of how community leaders around the country are solving these problems by working with nature, not against it. Black Brook is featured in this DVD because of the direct impacts to the community by outdated infrastructure, a return to the natural condition that makes the surrounding community safer and more resilient to weather extremes, and restoring vital habitat for fish and wildlife. This documentary can be viewed by visiting the American Rivers website at: http://www.americanrivers.org/our-work/restoring-rivers/dams/restoring-americas-rivers-dvd.html.

As if on cue following the 2010 release of the American Rivers DVD, New Hampshire experienced Tropical Storm Irene in 2011. Although Black Brook is still adjusting to the dam removal and the changes to length and slope within the former impoundment area, the high flows associated with Tropical Storm Irene caused no damage to the Front Street Bridge, the adjacent commercial and residential properties, and there was no need to evacuate businesses or close off Front Street to traffic as had been the case in the two years leading up to the dam removal. With full access to undeveloped floodplains and ample flood storage capacity, Black Brook conveys extreme flows without risk to infrastructure in the corridor.

There have been very encouraging sightings of fish species returning to Black Brook now that a barrier to their passage has been eliminated and sufficient oxygen is present in the water to support biological communities. To date, the presence of bridle shiners (state threatened species), sea lamprey (furthest upstream sighting in Merrimack basin), American eel (species of concern), Tessellated darters (host species for endangered mussels), and Brown trout provide further evidence of the habitat improvements and ability of Black Brook to support aquatic species once again. The number of observed species of fish in the former impoundment area of Maxwell Pond has doubled since the dam was removed in 2009.

Restoration project partners continue to document the transition process from Maxwell Pond to Black Brook, a freely flowing stream. Each year, the Gulf of Maine Barrier Removal Monitoring Protocols (http://www.gulfofmaine.org/streambarrierremoval/) are being implemented within the project area to monitor the physical, chemical, and biological responses of the stream channel itself as well as the responses of aquatic and terrestrial communities to pre- and post-dam removal conditions. Although Maxwell Pond no longer exists and VLAP activities are no longer implemented, volunteers from the Manchester Urban Ponds Restoration Program continue to monitor the health of Black Brook.